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UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte CLINTON A. STALEY and
DARREN ALEXANDER GILES

Appeal 2007-2881
Application 09/672,352
Technology Center 2600

Decided: January 14, 2008

Before ANITA PELLMAN GROSS, ROBERT E. NAPPI, and JOHN A. JEFFERY, *Administrative Patent Judges*.

JEFFERY, *Administrative Patent Judge*.

DECISION ON APPEAL

1 Appellants appeal under 35 U.S.C. § 134 from the Examiner's rejection of claims 1, 4-6, 8-19, 21, and 23-31. We have jurisdiction under 35 U.S.C. § 6(b). We reverse.

STATEMENT OF THE CASE

Appellants invented a process for encoding video or image data. The process includes determining a separate function for each frame in a sequence of frames where each function relates encoding size to encoded quality for each frame in the sequence of frames. Prior to encoding any frame, all of the separate functions are searched to determine a best quality value for encoding the sequence of frames. The entire sequence of frames is then encoded with the determined best quality value.[1] Claim 1 is illustrative:

1. A process for encoding data, comprising:

determining a separate function for each frame in a sequence of frames, each function relating encoding size to encoded quality for each frame in the sequence of frames, each frame having data for an image;

prior to encoding any of the frames, performing a search of all of the separate functions to determine a best quality value for encoding the sequence of frames, whose encoded sizes satisfy one or more constraints, the constraints being associated with one of a transmission line bandwidth, a receiver buffer size and total compressed size;

encoding each frame of the entire sequence of frames with the determined best quality value;

determining whether each encoded frame satisfies the constraints; and

if the encoded frames satisfy the constraints, transmitting the sequence of encoded frames.

[1] *See generally* Spec. 1:16 - 3:5.

The Examiner relies on the following prior art references to show unpatentability:

Gonzales	US 5,231,484	Jul. 27, 1993
Lim	US 5,638,126	Jun. 10, 1997
Linzer	US 6,038,256	Mar. 14, 2000

1. Claims 1, 4-6, 8, 12-14, 16-19, 21, 23, and 26-31 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Lim and Linzer.
2. Claims 9-11, 15, 24, and 25 stand rejected under 35 U.S.C. § 103(a) as unpatentable over Lim, Linzer, and Gonzales.

Rather than repeat the arguments of Appellants or the Examiner, we refer to the Briefs and the Answer for their respective details. In this decision, we have considered only those arguments actually made by Appellants. Arguments which Appellants could have made but did not make in the Briefs have not been considered and are deemed to be waived. *See* 37 C.F.R. § 41.37(c)(1)(vii).

OPINION

We first consider the Examiner's rejection of claims 1, 4-6, 8, 12-14, 16-19, 21, 23, and 26-31 under 35 U.S.C. § 103(a) as unpatentable over Lim and Linzer. In rejecting claims under 35 U.S.C. § 103, it is incumbent upon the Examiner to establish a factual basis to support the legal conclusion of obviousness. *See In re Fine*, 837 F.2d 1071, 1073 (Fed. Cir. 1988). In so doing, the Examiner must make the factual determinations set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 17 (1966).

Discussing the question of obviousness of a patent that claims a combination of known elements, *KSR Int'l v. Teleflex, Inc.*, 127 S. Ct. 1727 (2007), explains:

> When a work is available in one field of endeavor, design incentives and other market forces can prompt variations of it, either in the same field or a different one. If a person of ordinary skill can implement a predictable variation, §103 likely bars its patentability. For the same reason, if a technique has been used to improve one device, and a person of ordinary skill in the art would recognize that it would improve similar devices in the same way, using the technique is obvious unless its actual application is beyond his or her skill. *Sakraida* [*v. AG Pro, Inc.,* 425 U.S. 273 (1976)] and *Anderson's-Black Rock*[*, Inc. v. Pavement Salvage Co.*, 396 U.S. 57 (1969)] are illustrative—a court must ask whether the improvement is more than the predictable use of prior art elements according to their established functions.

KSR, 127 S. Ct. at 1740. If the claimed subject matter cannot be fairly characterized as involving the simple substitution of one known element for another or the mere application of a known technique to a piece of prior art ready for the improvement, a holding of obviousness can be based on a showing that "there was an apparent reason to combine the known elements in the fashion claimed." *Id.* at 1740-41. Such a showing requires "some articulated reasoning with some rational underpinning to support the legal conclusion of obviousness. . . . [H]owever, the analysis need not seek out precise teachings directed to the specific subject matter of the challenged claim, for a court can take account of the inferences and creative steps that a person of ordinary skill in the art would employ." *Id.* at 1741 (quoting *In re Kahn*, 441 F.3d 977, 988 (Fed. Cir. 2006)).

If the Examiner's burden is met, the burden then shifts to the Appellants to overcome the prima facie case with argument and/or evidence.

Obviousness is then determined on the basis of the evidence as a whole and the relative persuasiveness of the arguments. *See In re Oetiker*, 977 F.2d 1443, 1445 (Fed. Cir. 1992).

Regarding the independent claims, the Examiner's rejection essentially finds that Lim teaches every claimed feature except for performing a search of all frames in the sequence for a best quality value prior to encoding any of the frames. The Examiner cites Linzer as teaching this feature and concludes that it would have been obvious to one of ordinary skill in the art at the time of the invention to combine the teachings of Linzer with Lim to gather all pre-encoding data to efficiently encode high quality images (Ans. 3-8).

Appellants argue that the prior art does not teach or suggest the following recited limitations: (1) a separate function for each frame in a sequence of frames that relates encoded size to encoded quality for each frame; (2) a search of all of the separate functions to determine a best quality value to encode the entire sequence; and (3) encoding each frame using the same determined best quality for all the frames. Furthermore, Appellants contend that Lim teaches away from searching all of the separate functions prior to encoding any of the frames (App. Br. 5; Reply Br. 1-2).

According to Appellants, the mere selection of a quantization parameter Qp in Lim does not teach or suggest a function that is determined for each frame in a sequence. Rather, Appellants argue, Lim merely determines Qp to encode a particular slice of a frame: a determination that is made on a slice-by-slice basis without any consideration of the entire frame. Appellants add that this selection of Qp in Lim does not teach or suggest the

recited relationship between each frame's encoded size versus encoded quality (App. Br. 8; Reply Br. 6).

Appellants also argue that since Lim requires the value of the current slice that is being encoded to determine the Qp value to utilize, it is impossible to perform a search of the various functions prior to encoding any of the frames. According to Appellants, Lim encodes each slice in real time dynamically while examining the buffer and the slice that is being encoded. By dynamically encoding such information, Appellants argue that it is impossible to perform a search of all of the functions prior to encoding any of the frames (App. Br. 8; Reply Br. 7).

In addition, Appellants emphasize that Linzer fails to teach a determination of a function whatsoever, let alone searching such functions to determine a best quality value. According to Appellants, Linzer's collection of statistics does not teach the use or determination of a function that is based on such statistics (App. Br. 8-9; Reply Br. 4).

The Examiner contends that Lim teaches a separate function for each frame in a sequence of frames that relates encoded size to encoded quality for each frame as claimed. According to the Examiner, a sequence of frames of varying sizes is sent through Lim's encoding system recursively. Based on the evaluated frame(s), the Examiner indicates that Lim decides which quantization parameter to use (Ans. 9-10).

The Examiner adds that Lim's system evaluates and selects the best quality value Qp from plural quality values obtained by functions performed by the Qp adjuster. This evaluation is said to involve ascertaining and searching the best quality value (Ans. 10). The Examiner also contends that skilled artisans would know that a frame is subdivided into slices, and

eventually the data is evaluated and determined on the basis of frames (Ans. 11, 13, 16).

Furthermore, the Examiner asserts that Linzer teaches searching all frames in the sequence for a best quality value prior to encoding any of the frames (Ans. 14). The Examiner adds that there is ample motivation to combine the references, and the references are combinable (Ans. 17-18).

We will not sustain the Examiner's rejection of the independent claims. Lim discloses a video signal encoding apparatus that decides the appropriate quantization parameter Qp to use. To this end, input data (i.e., in the form of blocks of transform coefficients) is fed to a quantizer 100. The quantizer quantizes the data based on a quantization parameter decided by a quantization parameter deciding block 10 (Lim, col. 3, ll. 11-20; the Figure).

The quantization parameter deciding block 10 includes a Qp adjuster 130, a memory 140, a controller 150, and a selector 160. A signal C1 denoting the degree of fullness of the buffer 120 is also coupled to the Qp adjuster. The Qp adjuster then determines a quantization parameter Qp depending upon the degree of fullness of the buffer. This quantization parameter is then fed to the selector 160. Also, a slice number signal C2 is fed to the selector 160 which represents which slice of a frame is being currently processed at the encoding device (Lim, col. 3, ll. 47-57).

In response to C2, selector 160 selects either (1) the Qp from the Qp adjuster 130, or (2) the Qp stored in memory 140. If C2 indicates that the first slice of the current frame is being processed, the Qp stored at the memory 140 is selected. But if C2 indicates that a slice other than the first

one is being processed, then the Qp from the Qp adjuster is selected (Lim, col. 4, ll. 1-8).

Based on this functionality, we agree with Appellants (App. Br. 8) that Lim merely determines a Qp value to use to encode a particular *slice* of a frame: a function for an entire frame is not determined. Significantly, the Qp is determined on a *slice-by-slice basis* without any consideration of the entire frame, let alone separate and distinct functions for each frame in the sequence.

But even if we assume, without deciding, that this system somehow determines separate "functions" for separate frames in a sequence as the Examiner suggests, we still fail to see how Lim's system would be capable of searching all of these separate functions prior to encoding any of the frames, let alone that such a search determines a best quality value for encoding the sequence of frames as claimed.

Significantly, Lim requires the value of the current slice that is being encoded to determine the Qp value to utilize. That is, Lim encodes each slice in real time *dynamically* while examining the buffer and the slice that is being encoded.

Furthermore, the Examiner's reliance on Linzer for ostensibly teaching searching all frames prior to encoding for a best quality value (Ans. 13-14) is unavailing. Linzer discloses a statistical multiplexer 20 that includes a statistics gatherer 24 which gathers a priori statistics[2] regarding

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[2] According to Linzer, these pre-stored statistics include any type of information indicative of the encoding complexity of a given signal which is generated before a bit allocation decision is made for that program (Linzer, col. 5, ll. 63-67). Examples of pre-encoding a priori statistics include the number of bits per picture at a given quantization level, an average quantization level, picture types, scene change locations and repeat field

video signals from video source 22. These statistics are then stored on first storage device 26 (Linzer, col. 6, ll. 5-13; Fig. 3). Statistics computer 30 retrieves the pre-stored statistics from the first storage device 26 along with stored video signals from the second storage device 28. Preferably, the retrieved video signals are uncompressed but include encoding information previously determined during pre-encoding by the statistics gatherer 24. The encoders 32-i encode the video signals using the retrieved encoding information (Linzer, col. 6, ll. 48-63; Fig. 3).

Linzer does teach gathering, storing, and retrieving statistics prior to encoding video signals as the Examiner indicates. But even if this functionality were applied to Lim's system, we still fail to see how such functionality reasonably teaches or suggests (1) determining a separate function for each frame in a sequence, and (2) searching all separate functions to determine a best quality value prior to encoding any of the frames. Although the statistics in Linzer are indicative of the encoding complexity of a given video signal, there is nothing in the cited prior art to suggest that a search of all separate functions is performed prior to encoding any frame, let alone that a separate function is associated with each frame.

For the foregoing reasons, we will not sustain the Examiner's rejection of independent claims 1, 16, and 19 as well as dependent claims 4-6, 8, 12-14, 17, 18, 21, 23, and 26-31.

With regard to the rejection of claims 9-11, 15, 24, and 25, the Examiner adds the disclosure of Gonzales (Ans. 8-9). However, since Gonzales does not cure the deficiencies noted above with respect to

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patterns (Linzer, col. 4, ll. 5-9).

independent claims 1 and 19, the obviousness rejection of claims 9-11, 15, 24, and 25 is also not sustained.

DECISION

We have not sustained the Examiner's rejections with respect to any claims on appeal. Therefore, the Examiner's decision rejecting claims 1, 4-6, 8-19, 21, and 23-31 is reversed.

REVERSED

tdl/gvw

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